CLAIMS

What is claimed is:

1. A method for fabricating a taper, comprising:

disposing a semiconductor waveguide on a substrate;

forming a protective layer on the semiconductor waveguide;

removing a portion of the protective layer to expose a portion of the semiconductor waveguide, the exposed portion of the semiconductor waveguide defining a footprint of the taper; and

forming a semiconductor layer on the exposed portion of the semiconductor waveguide to form the taper, the taper having a termination end and a longitudinal axis, wherein the termination end has at least one unetched surface that is angled relative to the longitudinal axis.

2. The method of claim 1 wherein the semiconductor waveguide is formed using a silicon on insulator (SOI) wafer.

3. The method of claim 1 wherein the protective layer comprises an oxide.

4. The method of claim 1 wherein the semiconductor layer is formed using a selective silicon epitaxy process.

5. The method of claim 4 wherein the semiconductor layer is formed into the taper without etching the semiconductor layer.

6. The method of claim 4 wherein the semiconductor layer has a sloped upper surface.

7. The method of claim 6 wherein the sloped upper surface is formed without etching the semiconductor layer.

8. The method of claim 1 wherein forming the semiconductor layer comprises depositing semiconductor material on the protective layer and the exposed portion of the semiconductor waveguide, followed by chemical mechanical polishing to expose the protective layer.

9. The method of claim 1 wherein a insulator layer is disposed beneath the semiconductor waveguide.

10. An apparatus for propagating an optical signal, the apparatus comprising:

a semiconductor waveguide;

a first insulating layer disposed on at least a first surface of the semiconductor waveguide;

a second insulating layer disposed on at least a second surface of the semiconductor waveguide; and

a semiconductor taper disposed on a portion of the second surface of the semiconductor waveguide, the semiconductor taper having a termination end and a longitudinal axis, wherein the termination end has at least one unetched surface that is angled relative to the longitudinal axis.

11. The apparatus of claim 10 wherein the semiconductor taper is formed from silicon epitaxially grown on a portion of the semiconductor waveguide left uncovered by the second insulating layer.

12. The apparatus of claim 11 wherein the semiconductor taper has a sloped surface that is parallel to the second surface of the semiconductor waveguide.

13. The apparatus of claim 12 wherein sloped surface of the semiconductor taper is an unetched surface.

14. The apparatus of claim 10 wherein the taper includes a second end to be coupled to an optical fiber.

15. The apparatus of claim 10 wherein the taper is formed from semiconductor material on the second insulating layer and the portion of the second surface of the semiconductor waveguide that has been planarized by chemical mechanical polishing to expose the second insulating layer.

16. An integrated circuit comprising:

a semiconductor waveguide;

a first insulating layer disposed on at least a first surface of the semiconductor waveguide;

a second insulating layer disposed on at least a second surface of the semiconductor waveguide;

a semiconductor taper disposed on a portion of the second surface of the semiconductor waveguide, the semiconductor taper having a longitudinal axis, a

termination end and a wide end, the termination end having an unetched surface that is angled relative to the longitudinal axis, and the wide end to be coupled to an optical fiber; and

a protective layer formed to cover at least a portion of the semiconductor layer.

17. The circuit of claim 16 wherein the semiconductor waveguide is formed from silicon and the semiconductor taper is formed from silicon epitaxially grown on a portion of the semiconductor waveguide left uncovered by the second insulating layer.

18. The circuit of claim 17 wherein the semiconductor taper has a sloped surface that is parallel to the second surface of the semiconductor waveguide.

19. The circuit of claim 18 wherein sloped surface of the semiconductor taper is an unetched surface.

20. The circuit of claim 16 wherein the taper is formed from semiconductor material on the second insulating layer and the portion of the second surface of the semiconductor waveguide that has been planarized by chemical mechanical polishing to expose the second insulating layer.

21. A system comprising:

an optical signal source;

an optical fiber, coupled to the optical signal source, to propagate an optical signal; and

an integrated circuit that includes:

a semiconductor waveguide;

a first cladding layer disposed on at least a first surface of the semiconductor waveguide;

a second cladding layer disposed on at least a second surface of the semiconductor waveguide; and

a semiconductor taper disposed on a portion of the second surface of the semiconductor waveguide, the semiconductor taper having a longitudinal axis, a termination end and a wide end, the termination end having an unetched surface that is angled relative to the longitudinal axis, and the wide end coupled to the optical fiber.

22. The system of claim 21 wherein the semiconductor waveguide is formed from silicon and the semiconductor taper is formed from silicon epitaxially grown on a portion of the semiconductor waveguide left uncovered by the second cladding layer.

23. The system of claim 22 wherein the semiconductor taper has a sloped surface that is parallel to the second surface of the semiconductor waveguide.

24. The system of claim 23 wherein sloped surface of the semiconductor taper is an unetched surface.